



# ICAO ENGINE EXHAUST EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: D-436-148 F1      BYPASS RATIO: 4.9  
 UNIQUE ID NUMBER: 132M003      PRESSURE RATIO ( $\pi_{co}$ ): 19.8  
 COMBUSTOR:      RATED THRUST ( $F_{oo}$ ) (kN): 64.4  
 ENGINE TYPE: TF

### REGULATORY DATA

CHARACTERISTIC VALUE:	HC	CO	NO <sub>x</sub>	SMOKE NUMBER
$D_p/F_{oo}$ (g/kN) or SN	5.7	58.7	37.5	7.2
AS % OF ORIGINAL LIMIT	29.2	49.8	47.1	27.0
AS % OF CAEP/2 LIMIT (NO <sub>x</sub> )			58.8	
AS % OF CAEP/4 LIMIT (NO <sub>x</sub> )			67.1	
AS % OF CAEP/6 LIMIT (NO <sub>x</sub> )			71.9	
AS % OF CAEP/8 LIMIT (NO <sub>x</sub> )			82.3	

### DATA STATUS

- PRE-REGULATION  
 x CERTIFICATION  
 - REVISED (SEE REMARKS)

### TEST ENGINE STATUS

x NEWLY MANUFACTURED ENGINES  
 x DEDICATED ENGINES TO PRODUCTION STANDARD  
 - OTHER (SEE REMARKS)

### EMISSIONS STATUS

x DATA CORRECTED TO REFERENCE  
 (ANNEX 16 VOLUME II)

### CURRENT ENGINE STATUS

(IN PRODUCTION, IN SERVICE UNLESS OTHERWISE NOTED)  
 - OUT OF PRODUCTION (DATE: - )  
 - OUT OF SERVICE (DATE: - )

### MEASURED DATA

MODE	POWER SETTING (% $F_{oo}$ )	TIME (minutes)	FUEL FLOW (kg/s)	EMISSIONS INDICES (g/kg)			SMOKE NUMBER
				HC	CO	NO <sub>x</sub>	
TAKE-OFF	100	0.7	0.548	0.10	0.54	18.93	6.7
CLIMB OUT	85	2.2	0.468	0.04	0.54	16.00	
APPROACH	30	4.0	0.218	0.07	2.99	7.26	
IDLE	7	26.0	0.093	2.26	23.46	3.64	
LTO TOTAL FUEL (kg) or EMISSIONS (g)			260				-
NUMBER OF ENGINES				8	8	8	8
NUMBER OF TESTS				8	8	8	8
AVERAGE $D_p/F_{oo}$ (g/kN) or AVERAGE SN (MAX)				5.2	56.0	36.2	6.7
SIGMA ( $D_p/F_{oo}$ in g/kN, or SN)				0.8	3.0	2.5	
RANGE ( $D_p/F_{oo}$ in g/kN, or SN)				2.4-12.1	39.8-85.5	32.7-40.8	5.8-8

### ACCESSORY LOADS

POWER EXTRACTION 0 (kW) AT - POWER SETTINGS  
 STAGE BLEED 0 (% CORE FLOW) AT - POWER SETTINGS

### ATMOSPHERIC CONDITIONS

BAROMETER (kPa)	99-102.7
TEMPERATURE (K)	266-301
ABS HUMIDITY (kg/kg)	0.00248-0.01624

### FUEL

SPEC	RT
H/C	1.92
AROM (%)	13.3-19.7

MANUFACTURER: IVCHENKO PROGRESS ZMBK  
 TEST ORGANIZATION: IVCHENKO PROGRESS ZMBK  
 TEST LOCATION: ZAPOROJE  
 TEST DATES: 27/12/1991-28/07/2006

### NO<sub>x</sub> REGULATION PARAGRAPH

x	2.3.2 c) (CAEP/4)
	2.3.2 d) (CAEP/6)
	2.3.2 e) (CAEP/8)

### REMARKS

1. NO<sub>x</sub> levels in accordance with Part III, Chapter 2, 2.3.2 c) (CAEP/4)

Compliance with Fuel Venting requirements:

x ('x' if complies, 'PR' if pre-regulation, '- ' if information is not available)